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Introduction

Human medical facilities, such as hospitals, nursing homes, research laboratories, physicians' offices, dentists' offices, and clinics, have the potential to generate several types of waste, including pathological, infectious, hazardous, radioactive, and general nontoxic solid waste. Veterinary hospitals, clinics, and research facilities have the potential to generate similar types of waste. Medical facilities often generate a large variety of waste, but in volumes that are small compared to an industrial facility. These wastes from medical and veterinary facilities often require different methods of handling and disposal.

A common method of disposal is an on- or off-site Hospital/Medical/Infectious Waste Incinerator (HMIWI). Such a device combusts the waste materials, producing air pollution, ash, and sludge. The Environmental Protection Agency now regulates the amount of air pollution that can be released from HMIWIs.

EPA has issued a new source performance standard (NSPS) that establishes emission limits for new and modified HMIWIs. "New" HMIWIs are those for which construction began after June 20, 1996. "Modified" HMIWIs (see Definitions section) are those for which modifications began after March 16,

1998. Existing HMIWIs for which construction began before June 20, 1996, or modifications began before March 16, 1998, are not subject to the NSPS for new and reconstructed HMIWIs. However, EPA has issued emission guidelines requiring states to regulate air emissions from existing HMIWIs. These guidelines provide emission limits that are similar to but less restrictive than the NSPS for new or modified HMIWIs.

Medical waste that is not incinerated may be subject to other federal, state, or local regulations. It is your responsibility to know what regulations apply to your facility and to comply with all environmental laws. Hazardous waste is regulated by EPA under the Resource Conservation and Recovery Act (RCRA) and by the state of Kansas. Radioactive waste is regulated under the Atomic Energy Act. Infectious waste is not regulated by EPA but is regulated by the state of Kansas, as is general nontoxic solid waste.

This pamphlet summarizes the NSPS for new and reconstructed HMIWIs and the guidelines for existing HMIWIs, provides an overview of hazardous waste regulations, and discusses pollution prevention as a way to reduce regulatory burdens and costs.

Air Pollution Regulations and Guidelines

NSPS for New or Modified Hospital/Medical/Infectious Waste Incinerators

The NSPS for hospital/medical/infectious waste incinerators (HMIWIs) became final September 15, 1997. The rule sets limits for nine air pollutants: dioxins/furans, mercury, lead, cadmium, particulate matter, carbon monoxide, hydrogen chloride, sulfur dioxide, and nitrogen oxides. The rule also sets limits for opacity (visibility).

Who Is Affected

The NSPS affects all new and modified HMIWIs. Combustors that meet certain requirements are exempt from the NSPS. These include:

1. Co-fired combustors that combust less than 10 percent hospital or medical/infectious waste by weight (on a calendar quarter basis).

Operators must:

- Notify KDHE of an exemption claim and estimate relative quantities of the types of fuels to be combusted.
- Keep quarterly records showing that less than 10 percent of the weight of fuel combusted is hospital and medical/infectious waste. (Note: Pathological, low-level radioactive, and chemotherapeutic waste is not counted for the 10 percent calculation.)
- Be subject to an enforceable requirement limiting the unit to combusting a fuel feed stream that contains 10 percent

or less hospital and medical/infectious waste by weight.

2. Any combustor during periods when only pathological, low-level radioactive, or chemotherapeutic waste is burned.

Operators must:

- Notify KDHE of an exemption claim.
 - Keep quarterly records showing the times when this occurs.
3. Any combustor required to have a permit under Section 3005 of the Solid Waste Disposal Act.
 4. Municipal waste combustors meeting certain requirements.
 5. Any pyrolysis unit.
 6. Cement kilns firing hospital or medical/infectious waste.

Compliance Requirements

The emission limits for HMIWIs depend on their waste-burning capacity. Small HMIWIs have a waste-burning capacity of 200 pounds per hour or less. Medium HMIWIs have a capacity of more than 200 pounds per hour to 500 pounds per hour. Large HMIWIs have a capacity of more than 500 pounds per hour. The waste-burning capacity is determined by the maximum design capacity or the maximum charge rate as established during the most recent performance test. You may establish a maximum charge rate for your HMIWI unit that is lower than the design capacity. For example, a “medium” unit with a

design capacity of 250 pounds per hour may be designated as “small” for the NSPS if a maximum charge rate of 200 pounds per hour is established. Establishment of a maximum charge rate must be federally enforceable, typically through the use of limits stated by an operating permit.

The emission limits for small, medium, and large new or modified HMIWIs are listed in Table 1.

In addition to the emission limits, new or modified HMIWIs will be required to do the following:

Siting a new facility (new sources only)

- Prepare a siting analysis that considers air pollution control alternatives that minimize potential risk to public health and the environment.
- Submit an initial notification report to EPA, including the results of the siting analysis and a letter from KDHE approving construction and operation of your facility.

Operator training (See Operator Training and Qualification in Appendix B for more detail.)

- Upon startup or by March 16, 1998, whichever is later, complete HMIWI operator training course and qualify operators.
- Maintain information regarding HMIWI operating procedures and review the information annually.

Waste management plan

- Prepare a waste management plan that identifies the feasibility and approach for separating certain components of the health care waste stream in order to reduce the amount of toxic emissions. (The American Hospital Association publication “An Ounce of Prevention: Waste Reduction Strategies for Health Care Facilities” must be considered in developing the plan.)

Compliance and performance testing requirements (See Compliance and Performance Testing in Appendix B for more detail.)

- Within 180 days of initial startup or by March 16, 1998, whichever is later, conduct an initial performance test to determine compliance with all emission limits, except sulfur dioxide and nitrogen oxides, and to establish operating parameters.
- Conduct an annual performance test to determine compliance with particulate matter (PM), carbon monoxide (CO), and hydrogen chloride (HCl) limits. You may conduct PM, CO, and HCl tests every third year if the previous three performance tests show compliance for these emissions.
- Conduct an annual opacity test.
- Perform annual fugitive emission testing (new and modified large HMIWIs only).

Monitoring requirements

- Install and maintain equipment to continuously monitor operating parameters, including waste material charge rate,

Table 1. Emission Limits for New and Modified HMIWIs

	Small HMIWIs (200 lb/hr or less)	Medium HMIWIs (>200 to 500 lb/hr)	Large HMIWIs (>500 lb/hr)
Pollutant	Emission Limit	Emission Limit	Emission Limit
Particulate matter	69 mg/dscm	34 mg/dscm	34 mg/dscm
Carbon monoxide	40 ppmv	40 ppmv	40 ppmv
Dioxins/furans	125 ng/dscm	25 ng/dscm	25 ng/dscm
Hydrogen chloride	15 ppmv or 99% reduction	15 ppmv or 99% reduction	15 ppmv or 99% reduction
Sulfur dioxide*	55 ppmv	55 ppmv	55 ppmv
Nitrogen oxides*	250 ppmv	250 ppmv	250 ppmv
Lead	1.2 mg/dscm or 70% reduction	0.07 mg/dscm or 98% reduction	0.07 mg/dscm or 98% reduction
Cadmium	0.16 mg/dscm or 65% reduction	0.04 mg/dscm or 90% reduction	0.04 mg/dscm or 90% reduction
Mercury	0.55 mg/dscm or 85% reduction	0.55 mg/dscm or 85% reduction	0.55 mg/dscm or 85% reduction
Stack opacity	10%	10%	10%
Fugitive emissions during ash handling	No limit	No limit	5% of observation period

*testing not required

lb = pounds

hr = hour

mg = milligrams

dscm = dry cubic meters at standard conditions

ppmv = parts per million by volume

ng = nanograms

secondary chamber temperature, use of bypass stack, and other control equipment parameters as appropriate. (See Table 2 for more information.)

Reporting (See Reporting and Recordkeeping Requirements in Appendix B for more detail.)

- Submit an initial notification report. New sources should include intent to construct, date construction is scheduled to begin, planned startup date, planned waste types, a waste management plan, and documentation from the siting analysis.
- Submit results of initial performance compliance test within 60 days of performing the test.
- Submit results of all annual performance tests.
- Submit semiannual reports on emission rates or operating parameters that have not been recorded or that exceeded allowable limits.

Recordkeeping

Maintain for five years records of:

- Initial performance test.
- Annual performance tests.
- Operating parameters.
- Maintenance.
- Operator training and qualifications.
- Records of siting analysis.

*Send reports to:

Director of Air, RCRA, and Toxins
Division
U.S. EPA Region 7
726 Minnesota Avenue
Kansas City, KS 66101

Send copies to:

Kansas Department of Health and
Environment
Bureau of Air and Radiation
Building 283, Forbes Field
Topeka, KS 66620

* When KDHE has adopted the NSPS (new and modified sources) and EPA has approved the state emission guidelines (existing sources), reports should be sent to KDHE only.

Compliance Dates for New or Modified HMIWIs

New or modified HMIWIs must comply with this standard by March 16, 1998, or upon startup, whichever is later.

Permit Requirements

The NSPS requires that you obtain an operating permit under the EPA-approved state operating permit program. Applications for operating permits must be submitted to KDHE by September 15, 2000. If you need more information about obtaining an operating permit, call the SBEAP technical assistance hotline at 800/578-8898.

Table 2. Operating Parameters to Be Monitored

Operating Parameters	Data Measurement	Data Recording	Type of Control System Affected
Maximum charge rate	Continuous	Once per hour	All
Maximum fabric filter inlet temperature	Continuous	Once per minute	Dry scrubber followed by fabric filter
Maximum flue gas temperature	Continuous	Once per minute	Dry scrubber followed by fabric filter; wet scrubber
Minimum secondary chamber temperature	Continuous	Once per minute	All
Minimum dioxin/furan sorbent flow rate	Hourly	Once per hour	Dry scrubber followed by fabric filter
Minimum HCl sorbent flow rate	Hourly	Once per hour	Dry scrubber followed by fabric filter
Minimum mercury (Hg) sorbent flow rate	Hourly	Once per hour	Dry scrubber followed by fabric filter
Minimum pressure drop across the wet scrubber or minimum horsepower or amperage to wet scrubber	Continuous	Once per minute	Wet scrubber
Minimum scrubber liquor flow rate	Continuous	Once per minute	Wet scrubber
Minimum scrubber liquor pH	Continuous	Once per minute	Wet scrubber

Emission Guidelines for Existing HMIWIs

The final emission guidelines for existing HMIWIs are similar to the NSPS for new and modified HMIWIs. The emission limits are less stringent, but the operating, monitoring, and reporting requirements are basically the same as for the NSPS.

Who Is Affected

The emission guidelines affect all HMIWIs that existed or were under construction before June 20, 1996, and that are not modified after March 16, 1998. See the Definitions section for an explanation of modified HMIWIs. Exceptions for co-fired combustors; the incineration of pathological, low-level radioactive, and chemotherapeutic wastes; and municipal combustors are the same as for new and modified HMIWIs. (See page 5.)

Compliance Requirements

As with the NSPS for new and modified HMIWIs, the emission limits for existing HMIWIs depend on their waste-burning capacity. The emission limits for small, medium, and large existing HMIWIs are listed in Table 3.

Alternative emission limits apply to certain small HMIWIs that operate in rural areas. If your HMIWI is at least 50 miles from the nearest standard metropolitan area boundary and burns no more than 2,000 pounds of hospital waste and medical/infectious waste per week, these alternative emission limits may apply. If you need assistance in determining whether your facility qualifies for the alternative emission limits for rural areas, call the SBEAP technical assistance hotline at

800/578-8898. The alternative emission limits are listed in Table 4.

In addition to the emission limits listed in Table 2 or Table 3, existing HMIWIs must meet the same requirements as new or modified HMIWIs for operating and monitoring, reporting, and recordkeeping. (See pages 6–8.) Operators of small HMIWIs in rural areas do not need to perform the annual performance tests, with the exception of an annual test for compliance with the opacity limit. However, they must provide for an annual equipment inspection of their facility.

Compliance Dates for Existing HMIWIs

Existing HMIWIs must comply with the emission guidelines within one year after EPA approves a state plan. The state plan for existing HMIWIs is to be submitted to EPA by September 15, 1998. These plans must provide for emission limits at least as strict as the emission guidelines presented in Table 2 (Table 3 for rural facilities). If EPA approves the state plan within six months, your existing HMIWI will need to be in compliance with the state's emission limits (based on the emission guidelines) by March 16, 2000.

Permit Requirements

You will need to apply for an operating permit from KDHE to continue operating your existing HMIWI. An application for an operating permit will be required by the date specified by KDHE in the state regulations. This date is projected to be in March or April 2000.

Table 3. Emission Limits for Existing HMIWIs

	Small HMIWIs (200 lb/hr or less)	Medium HMIWIs (>200 to 500 lb/hr)	Large HMIWIs (>500 lb/hr)
Pollutant	Emission Limits	Emission Limits	Emission Limits
Particulate matter	115 mg/dscm	69 mg/dscm	34 mg/dscm
Carbon monoxide	40 ppmv	40 ppmv	40 ppmv
Dioxins/furans	125 ng/dscm	125 ng/dscm	125 ng/dscm
Hydrogen chloride	100 ppmv or 93% reduction	100 ppmv or 93% reduction	100 ppmv or 93% reduction
Sulfur dioxide	55 ppmv	55 ppmv	55 ppmv
Nitrogen oxides	250 ppmv	250 ppmv	250 ppmv
Lead	1.2 mg/dscm or 70% reduction	1.2 mg/dscm or 70% reduction	1.2 mg/dscm or 70% reduction
Cadmium	0.16 mg/dscm or 65% reduction	0.16 mg/dscm or 65% reduction	0.16 mg/dscm or 65% reduction
Mercury	0.55 mg/dscm or 85% reduction	0.55 mg/dscm or 85% reduction	0.55 mg/dscm or 85% reduction
Stack opacity	10%	10%	10%

lb = pounds

hr = hour

mg = milligrams

dscm = dry cubic meters at standard conditions

ppmv = parts per million by volume

ng = nanograms

Table 4.

Alternative Emission Limits for Small Rural HMIWIs

Pollutant	Emission Limit
Particulate matter	197 mg/dscm
Carbon monoxide	40 ppmv
Dioxins/furans	800 ng/dscm
Hydrogen chloride	3,100 ppmv
Sulfur dioxide	55 ppmv
Nitrogen oxides	250 ppmv
Lead	10 mg/dscm
Cadmium	4 mg/dscm
Mercury	7.5 mg/dscm
Stack opacity	10%

mg = milligrams

dscm = dry cubic meters at standard
conditions

ppmv = parts per million by volume

ng = nanograms

Hazardous Waste Regulations

All facilities that produce hazardous or potentially hazardous waste should become familiar with the statutes and regulations that apply to them. It is your responsibility to

determine whether your waste is hazardous and to ensure that it is labeled, stored, transported, and disposed according to the law.

Definitions of Hazardous Waste

EPA has defined a waste as hazardous if it has certain properties that could pose danger to human health or the environment after being discarded. Hospitals and other medical facilities, such as labs, clinics, or physician's offices, are likely to produce hazardous waste. Two categories of hazardous waste—*listed* and *characteristic*—are commonly found in medical facilities. Listed wastes that may be generated by a medical facility include:

- Formaldehyde used for dialysis and in pathology labs.
- Ethylene oxide used to sterilize plastic materials.
- Solvents such as methylene chloride, pyridine, and trichloroethylene.
- Mercury from broken thermometers or blood pressure instruments (also a characteristic waste).
- Lead foil that shields X-ray film (also a characteristic waste).

In addition to the wastes specifically listed, a waste is considered hazardous if it exhibits one or more of the characteristics of ignitability, toxicity, corrosivity, or reactivity.

A waste is *ignitable* if it has a flash point of lower than 140 degrees Fahrenheit (consult

the material safety data sheet), readily causes fires and burns so vigorously that it creates a hazard, or is an ignitable compressed gas or an oxidizer as defined by Department of Transportation (DOT) regulations. Certain solvents used in routine maintenance of hospital equipment may be ignitable.

A waste is *toxic* if it fails the toxicity characteristic leaching procedure (TCLP). Toxic heavy metals include arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver. If you are disposing of any materials that have identified toxic components, you may need to have these materials tested to determine whether they can be sent to a landfill. All bulk materials put into a landfill must be dry.

A waste is *corrosive* if it is highly acidic or alkaline (it has a pH less than or equal to 2 or greater than or equal to 12.5).

A waste is *reactive* if it normally is unstable, reacts violently with water, generates toxic gases such as hydrogen cyanide or hydrogen sulfide when exposed to water or corrosive materials, or is capable of detonation or explosion when exposed to heat or flame.

Infectious Waste

Infectious waste is not defined as hazardous. However, infectious waste must be incinerated or treated before land disposal or release to the sewer. Untreated infectious waste may be sent to a hazardous waste landfill or sanitary landfill with authorization from KDHE. Guidelines for managing infectious waste can be obtained from the Solid Waste Processing and Special Wastes Unit of the Bureau of Waste Management (KAR 28-29-27). (See Resources section of this pamphlet for contact information.)

Radiological Waste

Radiological waste that is not mixed with hazardous waste is regulated by KDHE's Bureau of Air and Radiation under the Atomic Energy Act. If any hazardous waste is mixed with radiological waste, the hazardous component is regulated by KDHE's Bureau of Waste Management. (See Resources section of this pamphlet for contact information.)

Some waste is exempt from the hazardous waste regulations. For example, protective lead shields and lead foil that shields X-ray film are regulated as hazardous waste if they are not recycled.

Categories of Hazardous Waste Generators

Kansas regulations define three categories of hazardous waste generators: small quantity generators, Kansas generators, and EPA generators. Many small hospitals and doctor's and dentist's offices are small quantity or Kansas generators. You must determine your generator category to determine which hazardous waste regulations apply to you. Your facility may change its status from one category to another, depending on how much waste it generates in a given period. If you generate or accumulate more hazardous waste than allowed for your current generator status, you must meet the requirements of the new category.

In determining your status as a hazardous waste generator, *count* all quantities of hazardous waste that:

- You store on site.
- You package and transport off site.
- You place directly in a regulated on-site treatment or disposal unit.
- You generate as still bottoms or sludge and remove from product storage tanks.

Do not count waste that:

- Is specifically exempt, such as used oil, lead foil, or spent batteries that are recycled.

- May be left in the bottom of containers that have been completely emptied by conventional means such as pouring and pumping.
- Is reclaimed continuously on site without storing. However, count residue removed from recycling apparatus, as well as spent cartridge filters.
- Is managed in an elementary neutralization unit, a totally enclosed treatment unit, or a wastewater treatment unit.
- Is discharged directly to a publicly owned treatment works (POTW) without being stored. In this case you must comply with the Clean Water Act.
- You already counted once during the month, reclaimed, and used again.

You can reduce your quantity of hazardous waste by separating hazardous and nonhazardous waste. A mixture of the two types of waste must comply with applicable hazardous waste regulations.

Small Quantity Generator

You are considered a small quantity generator if your facility meets *both* of the following conditions:

1. You produce no more than 55 pounds (25 kilograms) of all hazardous waste, or no more than 2.2 pounds (1 kilogram) of acutely hazardous waste in a calendar month.
2. You accumulate no more than 2,200 pounds (1,000 kilograms) of hazardous waste, no more than 2.2 pounds of acutely

hazardous waste, or no more than 55 pounds (25 kilograms) of debris and contaminated materials from the cleanup of spilled acutely hazardous waste.

As a small quantity generator you are not subject to any notification or reporting requirements, but you are required to manage your hazardous waste in an environmentally sound manner.

- You must identify all of the hazardous waste you generate.
- Accumulations of 55 pounds or more must be recycled, properly treated or disposed on site, or transported to an authorized hazardous waste facility.
- Smaller accumulations may be disposed by recycling, reusing, reclaiming, disposing at a permitted solid waste landfill (such as a municipal or county landfill), or disposing at a permitted hazardous waste facility. Smaller accumulations also may be neutralized and discharged to the sanitary sewer. However, you must have prior permission from the city and you may not discharge hazardous waste such as solvents, sludges, or pesticides to the sanitary sewer.
- You may not dispose of any quantity of hazardous waste by dumping it on the surface of the ground or into surface waters, burying it at an unpermitted site, or using waste such as a solvent to kill weeds.

For more information, contact the KDHE Bureau of Waste Management at 785/296-1617.

Kansas Generator

You are considered a Kansas generator if your facility meets *all* of the following conditions:

1. You generate a total of 55 pounds or more and less than 2,200 pounds of all hazardous waste in a calendar month.
2. You generate less than 2.2 pounds of acutely hazardous waste and less than 55 pounds of debris and contaminated materials from the cleanup of spilled acutely hazardous waste in a calendar month.
3. You accumulate no more than 2,200 pounds of hazardous waste or 2.2 pounds of acutely hazardous waste, and no more than 55 pounds of debris and contaminated materials from the cleanup of spilled acutely hazardous waste, in a calendar month.

As a Kansas generator you are subject to several regulations, including obtaining an EPA identification number, preparing a manifest for all off-site shipments of hazardous waste, and meeting emergency preparedness requirements. If you think that you may

be classified as a Kansas generator, contact KDHE at 785/296-1617 for more information.

EPA Generator

You are considered an EPA generator if your facility meets *any* of the following conditions:

1. You generate in any single month or accumulate at any time 2,200 pounds or more of hazardous waste.
2. You generate in any single month or accumulate at any time 2.2 pounds or more of acutely hazardous waste.
3. You generate or accumulate at any time more than 55 pounds of debris and contaminated materials from the cleanup of spilled acutely hazardous waste.

As an EPA generator you are subject to several regulations, including obtaining an EPA identification number, preparing a manifest for all off-site shipments of hazardous waste, and meeting emergency preparedness requirements. If you think that you may be classified as an EPA generator, contact KDHE at 785/296-1617 for more information.

Shipping Waste Off Site

The three most important things to remember when shipping hazardous waste off site are:

- Choose a reputable hauler and facility with EPA ID numbers.
- Package and label all waste appropriately.
- Prepare a hazardous waste manifest, being sure all copies are readable.

The hauler you choose will transport your waste, and the waste management facility will

be the final destination. But remember, *you* are legally responsible for the waste you produce. You must ensure that your transporter and waste facility meet applicable state and federal regulations. Disposal facilities must have permits issued by EPA or the state in which the facility is located. Under federal law, you may use only authorized hazardous waste transporters and disposal facilities that have been assigned EPA identification numbers.

Preventing Pollution and Reducing Waste

Pollution Prevention (P2) reduces the amount of waste created. The goal of P2 is to avoid generating waste, rather than controlling or treating waste after it is generated. P2 can provide the following benefits for your company:

- Cost savings from reducing the amount of material purchased and reducing waste treatment and disposal fees.
- Less regulatory recordkeeping and fewer reporting requirements.

- An enhanced public image.
- A safer workplace.

A complete P2 program often includes changes in equipment, raw materials, and technology. However, improvements in housekeeping, maintenance, material management, and employee training can cut waste generation with net savings for your facility.

Separate Your Waste

For many medical facilities, separating types of waste is an effective P2 activity that also reduces disposal costs. For example, including with infectious waste such noninfectious waste as batteries, X-ray film, thermometers, and packaging can increase both the cost of disposal and the amount of metals emitted to the atmosphere during incineration.

Reduce disposal costs by:

- Separating hazardous and nonhazardous waste. If you mix these wastes, they are all considered hazardous.
- Separating hazardous and infectious waste.
- Not diluting hazardous waste. Diluting increases the volume of material that must be disposed.
- Separating recyclable waste and nonrecyclable waste.

Educate Employees and Implement a Plan

An effective educational program may help reduce the costs associated with regulated waste. For example, Chesapeake General Hospital of Chesapeake, Virginia, reduced “red bag” waste from 6 pounds per adjusted patient day to 1.3 pounds. The reduction was

attributed to educating employees and medical staff about the difference between regulated medical waste and ordinary solid waste. (BNA Environmental Reporter, page 1443, Nov. 8, 1996)

CASE STUDY

Butterworth Hospital in Lansing, Michigan

Change: Implementation of a waste reduction program

Yearly savings:

Reusable pressure-relief mattresses	\$40,000
Recycled paper	8,260
Paintless pencils	200
Recharged toner cartridges	3,954
Washable slippers	5,000
Reusable fracture pans	2,160
Distillation of xylene and alcohol*	1,700
Reusing twist ties	100
Composting food waste*	<u>5,000</u>
Total savings	\$66,374

*Projected savings

Courtesy of Environmental Assistance Division, Michigan Department of Environmental Quality.

Use an Alternative Technology

Using an alternative technology is often a wise P2 choice that also saves money. For example, some medical facilities are choosing alternatives to operating on-site incinerators, including:

- Outsourcing (having medical waste picked up and treated off site by a commercial service).
- Autoclave treatment.
- Microwave treatment.

In Virginia, 41 hospitals have formed the Virginia Health Care Waste Management Cooperative. Medical waste is picked up and transported to a commercial facility in

Charlotte, North Carolina. A key part of this program is employee education to ensure the proper separation of “red bag” waste and solid waste. Other hospitals are finding that autoclave systems or microwave systems with shredders cost less than on-site incinerators.

If you are using ethylene oxide (EO) or a mixture of EO and chlorofluorocarbon (CFC) to sterilize equipment, consider evaluating a new method of sterilization. EO is a hazardous air pollutant with acute and chronic health effects. CFC is an ozone-depleting chemical. Ozone, radiation, vapor-phase hydrogen peroxide, and microwave radiation are alternative treatments.

Upgrade Equipment

Pollution prevention can be accomplished in many cases by replacing old or outdated equipment with newer equipment. For example, if you replace mercury thermometers with digital thermometers you eliminate

the possibility of mercury spills. Radioactive waste can be reduced by replacing radiation-dependent testing equipment with upgraded equipment in laboratories.

Laboratories

Improved laboratory practices have the potential for reducing waste, preventing pollution, and decreasing liability and clean-up costs. Improved laboratory practices may include:

- Increased use of instrumentation.
- Mercury recovery and recycling.
- Solvent recovery and recycling.
- Recovery of metals from catalysts.
- Reduction of the use of highly toxic chemicals in experiments.
- Segregating hazardous from nonhazardous waste.
- Destroying or treating hazardous waste products when experiments are completed.

Housekeeping

Good housekeeping is essential to P2 efforts. An effective housekeeping program will implement procedures to:

- Store chemicals properly.
- Control inventory.
- Rotate stock.
- Prevent spills.
- Clean up spills properly.
- Separate waste.

If you can reduce the number of housekeeping chemicals purchased or buy materials in bulk, you may save storage space and reduce disposal costs for containers and outdated chemicals.

Recycling certain materials may help reduce your solid waste disposal costs. Office waste such as aluminum, glass, newspaper, corrugated boxes, and office paper can be recycled easily.

In addition to recycling common materials, you may be able to recycle certain solvents or chemicals. For example, some hospitals recycle acetone in-house, reducing the amount of material that must be disposed as a hazardous waste.

CASE STUDY

Pleasant View Care Center, Whiting, Iowa

Change: Replaced packaged chemicals with metered chemicals for laundry and housekeeping. Implemented an alternative linen system through which linen poundage was reduced by 30 to 40 percent and the fabric had improved soil release characteristics.

Cost: Free, vendor-supplied dispensing equipment

Yearly savings:

Laundry system

Metered chemicals	\$5,000
New linen program	2,307
Housekeeping chemicals	<u>5,755</u>
Total savings	\$13,062

Courtesy of Iowa WRAP.

Maintenance and Operating Procedures

Improved maintenance for your facility or equipment may be an important P2 step. Does the building need better insulation? Are the windows energy efficient? Can you upgrade lighting and heating systems to be more energy efficient? Is your hospital and medical/infectious waste incinerator (HMIWI) being operated efficiently?

Saving energy saves money and reduces the pollution released from power plants. Properly maintained equipment has better performance and lasts longer than poorly maintained equipment. This also translates into cost savings for your facility.

Maintenance of buildings, vehicles, and grounds produces waste oils, solvents, pesticides, and water treatment chemicals. Reduce maintenance waste by:

- Collecting waste oils and solvents for recycling.
- Separating oils and solvents that can be recycled from those that cannot.
- Using water-based paints in maintenance.
- Reducing pesticide applications and using nonchemical pest control methods.

CASE STUDY

Des Moines General Hospital

Change: Improved incinerator operation efficiency by using a new log sheet. By using 15-minute loading time increments and loading 40 pounds each time, operating efficiency of the incinerator improved to nearly 100 percent.

Yearly savings: \$4,830

Additional benefit: Increased useful operating life of the equipment.

Courtesy of Iowa WRAP.

Food Service

If your facility operates a cafeteria or patient food service program, you may be able to reduce food waste or other waste associated with preparing meals.

Reduce food-related waste by:

- Using a food management computer program, which may help reduce over-production of meals.

- Choosing reusable dinnerware.
- Buying products in bulk.
- Serving beverages from dispensers instead of single-use containers.

A composting program for food waste can reduce the cost of landfill disposal.

Conclusion

The first step to pollution prevention and waste reduction for your medical facility is to evaluate your current operations. Where is waste generated in your facility? Do nontoxic or less toxic alternatives exist for the materials you use? Will separation of certain types of waste make them easier and less costly to dispose? Are employees adequately informed about how to prevent pollution and reduce waste in their departments? Start with no-cost

and low-cost P2 options, then evaluate other options.

The Kansas SBEAP staff can help you identify ways to prevent pollution. That will lead to cost savings, reduced regulatory burdens, and a safer workplace. Call the Kansas SBEAP technical assistance toll-free hotline at KSU, 800/578-8898.

Appendix A

Disposal of Dead Animals

An issue specific to veterinary facilities and animal shelters is the disposal of dead animals. KDHE provides technical guidance for disposal of dead animals in Technical Guidance Document 94-01. In addition to following the document guidelines, check with local waste management authorities to

ensure that you are complying with local laws concerning the disposal of dead animals.

KDHE lists disposal options for small and large animals in order of preference. These options are shown below:

Small Animals	Large Animals
Permitted municipal solid waste landfill	Commercial rendering facility
Local veterinarian*	Direct haul to permitted municipal solid waste landfill
Pet cemetery	Local large animal veterinarian*
Incinerator	Burial on site (e.g., farm)
Burial on site	Direct haul to a county-owned construction or demolition landfill
Transfer station with proper packaging**	

* The option of taking the animal to a local veterinarian is given to the general population because veterinarians typically provide this service to pet owners.

**Proper packaging would include 5-gallon plastic pails with lids or double bagging in plastic trash sacks.

Appendix B

Select Sections of the Final Rule

The “Standards of Performance for New Stationary Sources and Emission Guidelines for Existing Sources: Hospital/Medical/ Infectious Waste Incinerators” final rule can be found in the Federal Register, Vol. 62, No. 178, pp. 48347–48391 (September 15, 1997). Portions of the final rule are included in this

appendix to give you a better understanding of the requirements you must meet when operating an HMIWI. If you need more information than is provided in this pamphlet, you may wish to obtain a copy of the final rule as published in the Federal Register.

Operator Training and Qualification (40 CFR 60.53c)

- (a) No owner or operator of an affected facility shall allow the affected facility to operate at any time unless a fully trained and qualified HMIWI operator is accessible, either at the facility or available within one hour. The trained and qualified HMIWI operator may operate the HMIWI directly or be the direct supervisor of one or more HMIWI operators.
- (b) Operator training and qualification shall be obtained through a state-approved program or by completing the requirements included in paragraphs (c) through (g) of this section.
- (c) Training shall be obtained by completing an HMIWI operator training course that includes, at a minimum, the following provisions:
 - (1) 24 hours of training on the following subjects:
 - (i) Environmental concerns, including pathogen destruction and types of emissions;
 - (ii) Basic combustion principles, including products of combustion;
 - (iii) Operation of the type of incinerator to be used by the operator, including proper startup, waste charging, and shutdown procedures;
 - (iv) Combustion controls and monitoring;
 - (v) Operation of air pollution control equipment and factors affecting performance (if applicable);
 - (vi) Methods to monitor pollutants (continuous emission monitoring systems and monitoring of HMIWI and air pollution control device operating parameters) and equipment calibration procedures (where applicable);
 - (vii) Inspection and maintenance of the HMIWI, air pollution control devices, and continuous emission monitoring systems;
 - (viii) Actions to correct malfunctions or conditions that may lead to malfunction;
 - (ix) Bottom and fly ash characteristics and handling procedures;
 - (x) Applicable federal, state, and local regulations;
 - (xi) Work safety procedures;
 - (xii) Pre-startup inspections; and
 - (xiii) Recordkeeping requirements.

- (2) An examination designed and administered by the instructor.
- (3) Reference material distributed to the attendees covering the course topics.
- (d) Qualification shall be obtained by:
 - (1) Completion of a training course that satisfies the criteria under paragraph (c) of this section; and
 - (2) Either six months experience as an HMIWI operator, six months experience as a direct supervisor of an HMIWI operator, or completion of at least two burn cycles under the observation of two qualified HMIWI operators.
- (e) Qualification is valid from the date on which the examination is passed or the completion of the required experience, whichever is later.
- (f) To maintain qualification, the trained and qualified HMIWI operator shall complete and pass an annual review or refresher course of at least four hours covering, at a minimum, the following:
 - (1) Update of regulations;
 - (2) Incinerator operation, including startup and shutdown procedures;
 - (3) Inspection and maintenance;
 - (4) Responses to malfunctions or conditions that may lead to malfunction; and
 - (5) Discussion of operating problems encountered by attendees.
- (g) A lapsed qualification shall be renewed by one of the following methods:
 - (1) For a lapse of less than three years, the HMIWI operator shall complete and pass a standard annual refresher course described in paragraph (f) of this section.
 - (2) For a lapse of three years or more, the HMIWI operator shall complete and pass a training course with the minimum criteria described in paragraph (c) of this section.
- (h) The owner or operator of an affected facility shall maintain documentation at the facility that addresses the following:
 - (1) Summary of the applicable standards under this subpart;
 - (2) Description of basic combustion theory applicable to an HMIWI;
 - (3) Procedures for receiving, handling, and charging waste;
 - (4) HMIWI startup, shutdown, and malfunction procedures;
 - (5) Procedures for maintaining proper combustion air supply levels;
 - (6) Procedures for operating the HMIWI and associated air pollution control systems within the standards established under this subpart;
 - (7) Procedures for responding to periodic malfunction or conditions that may lead to malfunction;
 - (8) Procedures for monitoring HMIWI emissions;
 - (9) Reporting and recordkeeping procedures; and
 - (10) Procedures for handling ash.

- (i) The owner or operator of an affected facility shall establish a program for reviewing the information listed in paragraph (h) of this section annually with each HMIWI operator (defined in Sec. 60.51c).
 - (1) The initial review of the information listed in paragraph (h) of this section shall be conducted within six months after the effective date of this subpart or prior to assumption of responsibilities affecting HMIWI operation, whichever date is later.
 - (2) Subsequent reviews of the information listed in paragraph (h) of this section shall be conducted annually.
- (j) The information listed in paragraph (h) of this section shall be kept in a readily accessible location for all HMIWI operators. This information, along with records of training, shall be available for inspection by the EPA or its delegated enforcement agent upon request.

Compliance and Performance Testing (40 CFR 60.56c)

- (a) The emission limits under this subpart apply at all times except during periods of startup, shutdown, or malfunction, provided that no hospital waste or medical/infectious waste is charged to the affected facility during startup, shutdown, or malfunction.
- (b) The owner or operator of an affected facility shall conduct an initial performance test as required under Sec. 60.8 to determine compliance with the emission limits using the procedures and test methods listed in paragraphs (b)(1) through (b)(12) of this section. The use of the bypass stack during a performance test shall invalidate the performance test.
 - (1) All performance tests shall consist of a minimum of three test runs conducted under representative operating conditions.
 - (2) The minimum sample time shall be one hour per test run unless otherwise indicated.
 - (3) through (12)
EPA reference methods for selecting sampling locations and measuring pollutant emissions and opacity are given in the final rule.
- (c) Following the date on which the initial performance test is completed or is required to be completed under Sec. 60.8, whichever date comes first, the owner or operator of an affected facility shall:
 - (1) Determine compliance with the opacity limit by conducting an annual performance test (no more than 12 months following the previous performance test) using the applicable procedures and test methods listed in paragraph (b) of this section.
 - (2) Determine compliance with the PM, CO, and HCl emission limits by conducting an annual performance test (no more than 12 months following the previous performance test) using the applicable procedures and test methods listed in paragraph (b) of this section. If all three performance tests over a three-year period indicate compliance with the emission limit for a pollutant (PM, CO, or HCl), the owner or operator may forego a performance test for that

pollutant for the subsequent two years. At a minimum, a performance test for PM, CO, and HCl shall be conducted every third year (no more than 36 months following the previous performance test). If a performance test conducted every third year indicates compliance with the emission limit for a pollutant (PM, CO, or HCl), the owner or operator may forego a performance test for that pollutant for an additional two years. If any performance test indicates noncompliance with the respective emission limit, a performance test for that pollutant shall be conducted annually until all annual performance tests over a three-year period indicate compliance with the emission limit. The use of the bypass stack during a performance test shall invalidate the performance test.

- (3) For large HMIWI, determine compliance with the visible emission limits for fugitive emissions from fly ash/bottom ash storage and handling by conducting a performance test using EPA Reference Method 22 on an annual basis (no more than 12 months following the previous performance test).
- (4) Facilities using a CEMS to demonstrate compliance with any of the emission limits under Sec. 60.52c shall:
 - (i) Determine compliance with the appropriate emission limit(s) using a 12-hour rolling average, calculated each hour as the average of the previous 12 operating hours (not including startup, shutdown, or malfunction).
 - (ii) Operate all CEMS in accordance with the applicable procedures under appendices B and F of this part.
- (d) The owner or operator of an affected facility equipped with a dry scrubber followed by a fabric filter, a wet scrubber, or a dry scrubber followed by a fabric filter and wet scrubber shall:
 - (1) Establish the appropriate maximum and minimum operating parameters, indicated in Table 3 of this subpart for each control system (see Table 2 of this pamphlet), as site-specific operating parameters during the initial performance test to determine compliance with the emission limits; and
 - (2) Following the date on which the initial performance test is completed or is required to be completed under Sec. 60.8, whichever date comes first, ensure that the affected facility does not operate above any of the applicable maximum operating parameters or below any of the applicable minimum operating parameters listed in Table 3 of this subpart and measured as three-hour rolling averages (calculated each hour as the average of the previous three operating hours) at all times except during periods of startup, shutdown and malfunction. Operating parameter limits do not apply during performance tests. Operation above the established maximum or below the established minimum operating parameter(s) shall constitute a violation of established operating parameter(s).
- (e) Except as provided in paragraph (h) of this section, for affected facilities equipped with a dry scrubber followed by a fabric filter:


- (1) Operation of the affected facility above the maximum charge rate and below the minimum secondary chamber temperature (each measured on a three-hour rolling average) simultaneously shall constitute a violation of the CO emission limit.
 - (2) Operation of the affected facility above the maximum fabric filter inlet temperature, above the maximum charge rate, and below the minimum dioxin/furan sorbent flow rate (each measured on a three-hour rolling average) simultaneously shall constitute a violation of the dioxin/furan emission limit.
 - (3) Operation of the affected facility above the maximum charge rate and below the minimum HCl sorbent flow rate (each measured on a three-hour rolling average) simultaneously shall constitute a violation of the HCl emission limit.
 - (4) Operation of the affected facility above the maximum charge rate and below the minimum Hg sorbent flow rate (each measured on a three-hour rolling average) simultaneously shall constitute a violation of the Hg emission limit.
 - (5) Use of the bypass stack (except during startup, shutdown, or malfunction) shall constitute a violation of the PM, dioxin/furan, HCl, Pb, Cd, and Hg emission limits.
- (f) Except as provided in paragraph (h) of this section, for affected facilities equipped with a wet scrubber:
- (1) Operation of the affected facility above the maximum charge rate and below the minimum pressure drop across the wet scrubber or below the minimum horsepower or amperage to the system (each measured on a three-hour rolling average) simultaneously shall constitute a violation of the PM emission limit.
 - (2) Operation of the affected facility above the maximum charge rate and below the minimum secondary chamber temperature (each measured on a three-hour rolling average) simultaneously shall constitute a violation of the CO emission limit.
 - (3) Operation of the affected facility above the maximum charge rate, below the minimum secondary chamber temperature, and below the minimum scrubber liquor flow rate (each measured on a three-hour rolling average) simultaneously shall constitute a violation of the dioxin/furan emission limit.
 - (4) Operation of the affected facility above the maximum charge rate and below the minimum scrubber liquor pH (each measured on a three-hour rolling average) simultaneously shall constitute a violation of the HCl emission limit.
 - (5) Operation of the affected facility above the maximum flue gas temperature and above the maximum charge rate (each measured on a three-hour rolling average) simultaneously shall constitute a violation of the Hg emission limit.
 - (6) Use of the bypass stack (except during startup, shutdown, or malfunction) shall constitute a violation of the PM, dioxin/furan, HCl, Pb, Cd, and Hg emission limits.

- (g) Except as provided in paragraph (h) of this section, for affected facilities equipped with a dry scrubber followed by a fabric filter and a wet scrubber:
 - (1) Operation of the affected facility above the maximum charge rate and below the minimum secondary chamber temperature (each measured on a three-hour rolling average) simultaneously shall constitute a violation of the CO emission limit.
 - (2) Operation of the affected facility above the maximum fabric filter inlet temperature, above the maximum charge rate, and below the minimum dioxin/furan sorbent flow rate (each measured on a three-hour rolling average) simultaneously shall constitute a violation of the dioxin/furan emission limit.
 - (3) Operation of the affected facility above the maximum charge rate and below the minimum scrubber liquor pH (each measured on a three-hour rolling average) simultaneously shall constitute a violation of the HCl emission limit.
 - (4) Operation of the affected facility above the maximum charge rate and below the minimum Hg sorbent flow rate (each measured on a 3- hour rolling average) simultaneously shall constitute a violation of the Hg emission limit.
 - (5) Use of the bypass stack (except during startup, shutdown, or malfunction) shall constitute a violation of the PM, dioxin/furan, HCl, Pb, Cd, and Hg emission limits.
- (h) The owner or operator of an affected facility may conduct a repeat performance test within 30 days of violation of applicable operating parameter(s) to demonstrate that the affected facility is not in violation of the applicable emission limit(s). Repeat performance tests conducted pursuant to this paragraph shall be conducted using the identical operating parameters that indicated a violation under paragraph (e), (f), or (g) of this section.
- (i) The owner or operator of an affected facility using an air pollution control device other than a dry scrubber followed by a fabric filter, a wet scrubber, or a dry scrubber followed by a fabric filter and a wet scrubber to comply with the emission limits under Sec. 60.52c shall petition the administrator for other site-specific operating parameters to be established during the initial performance test and continuously monitored thereafter. The owner or operator shall not conduct the initial performance test until after the petition has been approved by the administrator.
- (j) The owner or operator of an affected facility may conduct a repeat performance test at any time to establish new values for the operating parameters. The administrator may request a repeat performance test at any time.

Reporting and Recordkeeping Requirements (40 CFR 60.58c)

- (a) The owner or operator of an affected facility shall submit notifications, as provided by Sec. 60.7. In addition, the owner or operator shall submit the following information:
- (1) Prior to commencement of construction;
 - (i) A statement of intent to construct;
 - (ii) The anticipated date of commencement of construction; and
 - (iii) All documentation produced as a result of the siting requirements of Sec. 60.54c.
 - (2) Prior to initial startup;
 - (i) The type(s) of waste to be combusted;
 - (ii) The maximum design waste-burning capacity;
 - (iii) The anticipated maximum charge rate; and
 - (iv) If applicable, the petition for site-specific operating parameters under Sec. 60.56c(i).
- (b) The owner or operator of an affected facility shall maintain the following information (as applicable) for a period of at least five years:
- (1) Calendar date of each record;
 - (2) Records of the following data:
 - (i) Concentrations of any pollutant listed in Sec. 60.52c or measurements of opacity as determined by the continuous emission monitoring system (if applicable);
 - (ii) Results of fugitive emissions (by EPA Reference Method 22) tests, if applicable;
 - (iii) HMIWI charge dates, times, and weights and hourly charge rates;
 - (iv) Fabric filter inlet temperatures during each minute of operation, as applicable;
 - (v) Amount and type of dioxin/furan sorbent used during each hour of operation, as applicable;
 - (vi) Amount and type of Hg sorbent used during each hour of operation, as applicable;
 - (vii) Amount and type of HCl sorbent used during each hour of operation, as applicable;
 - (viii) Secondary chamber temperatures recorded during each minute of operation;
 - (ix) Liquor flow rate to the wet scrubber inlet during each minute of operation, as applicable;
 - (x) Horsepower or amperage to the wet scrubber during each minute of operation, as applicable;
 - (xi) Pressure drop across the wet scrubber system during each minute of operation, as applicable;
 - (xii) Temperature at the outlet from the wet scrubber during each minute of operation, as applicable;
 - (xiii) pH at the inlet to the wet scrubber during each minute of operation, as applicable;
 - (xiv) Records indicating use of the bypass stack, including dates, times, and durations, and
 - (xv) For affected facilities complying with Secs. 60.56c(i) and 60.57c(c), the owner or operator shall maintain all operating parameter data collected.

- (3) Identification of calendar days for which data on emission rates or operating parameters specified under paragraph (b)(2) of this section have not been obtained, with an identification of the emission rates or operating parameters not measured, reasons for not obtaining the data, and a description of corrective actions taken.
 - (4) Identification of calendar days, times and durations of malfunctions, a description of the malfunction, and the corrective action taken.
 - (5) Identification of calendar days for which data on emission rates or operating parameters specified under paragraph (b)(2) of this section exceeded the applicable limits, with a description of the exceedances, reasons for such exceedances, and a description of corrective actions taken.
 - (6) The results of the initial, annual, and any subsequent performance tests conducted to determine compliance with the emission limits and/or to establish operating parameters, as applicable.
 - (7) All documentation produced as a result of the siting requirements of Sec. 60.54c;
 - (8) Records showing the names of HMIWI operators who have completed review of the information in Sec. 60.53c(h) as required by Sec. 60.53c(i), including the date of the initial review and all subsequent annual reviews;
 - (9) Records showing the names of the HMIWI operators who have completed the operator training requirements, including documentation of training and the dates of the training;
 - (10) Records showing the names of the HMIWI operators who have met the criteria for qualification under Sec. 60.53c and the dates of their qualification; and
 - (11) Records of calibration of any monitoring devices as required under Sec. 60.57c(a), (b), and (c).
- (c) The owner or operator of an affected facility shall submit the information specified in paragraphs (c)(1) through (c)(3) of this section no later than 60 days following the initial performance test. All reports shall be signed by the facilities manager.
- (1) The initial performance test data as recorded under Sec. 60.56c(b)(1) through (b)(12), as applicable.
 - (2) The values for the site-specific operating parameters established pursuant to Sec. 60.56c(d) or (i), as applicable.
 - (3) The waste management plan as specified in Sec. 60.55c.
- (d) An annual report shall be submitted one year following the submission of the information in paragraph (c) of this section and subsequent reports shall be submitted no more than 12 months following the previous report (once the unit is subject to permitting requirements under Title V of the Clean Air Act, the owner or operator of an affected facility must submit these reports semiannually). The annual report shall include the information specified in paragraphs (d)(1) through (d)(8) of this section. All reports shall be signed by the facilities manager.

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- (1) The values for the site-specific operating parameters established pursuant to Sec. 60.56c(d) or (i), as applicable.
 - (2) The highest maximum operating parameter and the lowest minimum operating parameter, as applicable, for each operating parameter recorded for the calendar year being reported, pursuant to Sec. 60.56c(d) or (i), as applicable.
 - (3) The highest maximum operating parameter and the lowest minimum operating parameter, as applicable for each operating parameter recorded pursuant to Sec. 60.56c(d) or (i) for the calendar year preceding the year being reported, in order to provide the administrator with a summary of the performance of the affected facility over a two-year period.
 - (4) Any information recorded under paragraphs (b)(3) through (b)(5) of this section for the calendar year being reported.
 - (5) Any information recorded under paragraphs (b)(3) through (b)(5) of this section for the calendar year preceding the year being reported, in order to provide the administrator with a summary of the performance of the affected facility over a two-year period.
 - (6) If a performance test was conducted during the reporting period, the results of that test.
 - (7) If no exceedances or malfunctions were reported under paragraphs (b)(3) through (b)(5) of this section for the calendar year being reported, a statement that no exceedances occurred during the reporting period.
 - (8) Any use of the bypass stack, the duration, reason for malfunction, and corrective action taken.
- (e) The owner or operator of an affected facility shall submit semiannual reports containing any information recorded under paragraphs (b)(3) through (b)(5) of this section no later than 60 days following the reporting period. The first semiannual reporting period ends six months following the submission of information in paragraph (c) of this section. Subsequent reports shall be submitted no later than six calendar months following the previous report. All reports shall be signed by the facilities manager.
- (f) All records specified under paragraph (b) of this section shall be maintained on site in either paper copy or computer-readable format, unless an alternative format is approved by the administrator.

Definitions

Bypass stack: A device used for discharging combustion gases to avoid severe damage to air pollution control devices or other equipment.

Chemotherapeutic waste: Waste resulting from the production or use of antineoplastic agents used for stopping or reversing the growth of malignant cells.

Co-fired combustor: A unit combusting hospital waste or medical/infectious waste with other fuel or waste.

Hazardous waste: Toxic, ignitable, corrosive, or reactive waste that requires special handling, treatment, and disposal.

Hospital/medical/infectious waste incinerator (HMIWI): A device that combusts any amount of hospital waste or medical/infectious waste.

Hospital waste: A waste generated at a hospital, including general nontoxic solid waste, medical/infectious waste, hazardous waste, and radioactive waste.

Infectious waste: A waste that has the potential to carry or transmit disease.

Low-level radioactive waste: Waste containing radioactive nuclides emitting primarily beta or gamma radiation, or both, in concentrations or quantities that exceed applicable federal or state standards for unrestricted release.

Medical/infectious waste: Waste generated in the diagnosis, treatment, or immunization of human beings or animals, including: cultures and stocks of infectious agents; pathological waste; blood and blood products; items contaminated with blood; sharps such as needles, scalpel blades, or syringes; isolation waste; and contaminated animal waste such as bedding.

Modified HMIWI: An HMIWI unit that has been changed after March 16, 1998, such that the cost of the modification exceeds 50 percent of the cost of the construction and installation of a new unit of similar size and design, or any change that increases the amount of any regulated air pollutant emitted by the unit.

Pathological waste: Waste consisting only of human or animal body parts or tissue, the bags or containers used to collect and transport the waste, and animal bedding (if applicable).

Pyrolysis: A chemical change due to heat.

Resources

For information about the NSPS standard or emission guidelines for HMIWIs:

Kansas Department of Health and Environment

Bureau of Air and Radiation, 785/296-1593 or

Kansas Department of Health and Environment

David Peter

785/296-1615

For information about hazardous waste disposal:

Kansas Department of Health and Environment

Waste Policy Planning and Outreach Section, 785/296-1617

Waste Programs Compliance and Enforcement Unit, 785/296-1604

For information about ash disposal from the HMIWI:

Kansas Department of Health and Environment

Joe Cronin, 785/296-1667

For information about infectious waste disposal:

Kansas Department of Health and Environment

Joe Cronin, 785/296-1667

For information about radioactive waste disposal:

Kansas Department of Health and Environment

Vick Cooper, 785/296-1561

Guides to Pollution Prevention: Selected Hospital Waste Streams, U.S. EPA, Risk Reduction Engineering Laboratory, Document EPA/625/7-90/009.

Hazardous Waste Generator Handbook, Bureau of Waste Management, Kansas Department of Health and Environment.

Does Your Business Produce Hazardous Waste? Many Small Businesses Do, U.S. EPA, Office of Solid Waste and Emergency Response, Document EPA/530-SW-90-027.

The Clean Air Act Amendments of 1990: A Guide for Small Businesses, U.S. EPA, Office of Air and Radiation, Document EPA/450-K-92-001.

The Plain English Guide to the Clean Air Act, U.S. EPA, Office of Air and Radiation, Document EPA/400-K-93-001.

